

# Loudspeaker Sensitivity

## Interpretation of Results

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## 1.00 Object

- 1.01 The object of this document is to provide an interpretation of the results of measurements of sensitivity at the AMS Acoustics test chambers.

## 2.00 Scope

- 2.01 The scope of this document is limited to an interpretation of sensitivity results.

## 3.00 Introduction

- 3.01 The sensitivity of a loudspeaker is defined as the direct sound pressure level referred to a distance of 1 meter from the loudspeaker along a '*reference axis*' when the power draw is 1 electrical Watt.
- 3.02 AMS Acoustics test loudspeakers as black box units, i.e. if a loudspeaker component is changed, then the unit is considered as being a different loudspeaker.
- 3.03 It must always be remembered that sensitivity results are with respect to the following:
- a) The reference axis,
  - b) The bandwidth of the test signal, and
  - c) The spectral 'shape' of the test signal (for wide band).

**4.00 Interpretation of Results**

4.01 Table 1 gives an example of the relevant sensitivity data provided by AMS Acoustics.

Table 1 – Example of Sensitivity Results

Parameter	Frequency [Hz]							dB	dBA
	125	250	500	1k	2k	4k	8k		
Sensitivity (dB @ 1m, 1W/Oct)	78	89	89	90	93	91	92	90	90
Sensitivity(dB @ 1m, 1W)250Hz-4kHz								91	91
Sensitivity(dB @ 1m, 1W)Speech Shape								88	85
Apportioned Power (%)	17	13	14	15	15	14	9		

Table 1

4.02 All sound pressure levels are in dB re 20µPa.

4.03 All relevant measurement equipment carries current traceable calibration.

4.04 Sensitivity measurements are made with the specified test signal and at the specified bandwidth given at the bottom-left of table 1. All other sensitivity levels are derived from this signal.

Wide band Sensitivity

4.05 The last two columns in table 1 give the ‘wide band sensitivity’ results.

4.06 Row one gives the linear and A-weighted sensitivity for the specified input signal and specified bandwidth.

4.07 Row two gives the linear and A-weighted sensitivity for the specified input signal with a reduced bandwidth of 250Hz – 4kHz (derived result).

4.08 Row three gives the linear and A-weighted sensitivity for speech shaped noise with the specified bandwidth. These represent the expected long-term average sensitivity for speech signals (derived result).

### Octave band Sensitivity

- 4.09 Row one gives the octave band sensitivities at the given octave band centre frequencies.
- 4.10 Octave band sensitivities represent the expected sensitivity if the loudspeaker were fed the specified test signal band limited to the respective octave band.
- 4.11 Note that the octave band sensitivities are not in themselves an indication of frequency response.

### Apportioned Power

- 4.12 The last row in table 1 gives the apportioned power in each octave band as a percentage of the total power using the specified test signal.
- 4.13 Apportioned power is a conceptual tool used to determine the octave band sensitivities. It describes how the total electrical power is distributed within each octave band, and is a result of the fact that the real part of a loudspeaker's impedance varies with frequency.